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# State and Federal Resources Allocated in Response to the Ogden, Utah EHV-1 Disease Outbreak

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## Background

There are several strains of equine herpesvirus (EHV) that cause a variety of disease syndromes in horses, including respiratory disease, abortion, neonatal death, and myeloencephalopathy. Equine herpesvirus-1 (EHV-1) occurs in horses around the world. The neurologic form of EHV-1 is referred to as equine herpesvirus myeloencephalopathy (EHM).<sup>1</sup> Not all horses infected with EHV-1 develop EHM.

From April 29 to May 8, 2011, the National Cutting Horse Association (NCHA) Western National Championship was held in Ogden, Utah. Some horses that attended the event were later diagnosed with EHV-1 infection, and some of these horses developed EHM. According to the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) "Equine Herpesvirus (EHV-1) Final Situation Report,"<sup>2</sup> 19 States<sup>3</sup> had primary exposed horses.<sup>4</sup> In addition, 162 EHV-1 or EHM confirmed or suspect cases were reported in 13 States.<sup>5</sup> Due to the scope of the outbreak—and at the request of the American Association of Equine Practitioners, American Horse Council, and National Assembly of State Animal Health Officials— an epidemiologic investigation was initiated by APHIS's Veterinary Services (VS).

The following analysis focuses on the Federal and State resources allocated for the field response to the EHV-1 outbreak. The goal of the analysis is to help Federal and State animal health official (SAHO) offices plan for future disease outbreaks by providing an estimate of the resources used to respond to the

EHV-1 outbreak. SAHO Offices and VS Area Offices determined how to respond to the outbreak situation in each state. Roles for SAHO and VS area offices varied by State.

## Data

VS Area Offices and SAHO offices in States with exposed horses were surveyed to determine the level of resources allocated in response to the EHV-1 outbreak. Surveys were sent to 37 offices. The analysis uses data from 19 completed surveys from 19 States: 5 from VS Area Offices and 14 from SAHO offices. These data represent resource allocations from 14 States: 7 with cases,<sup>6</sup> and 7 without cases. States with cases that responded represented 88 percent of all cases.

During the outbreak response, most SAHO offices allocated more resources than the VS Area Offices responsible for that State. In just one State with a case(s), the VS Area Office allocated more resources than the SAHO office.

## Analysis

Labor accounted for the largest portion of reported resources used to respond to the multistate EHV-1 outbreak. VS Area offices reported allocating 109 hours (regular and overtime<sup>7</sup>) to four activities related to the response (table 1). SAHO offices reported allocating 5,862 hours (table 2), with an average of 419 hours per office. SAHO offices allocated 87 percent of their total reported hours to meetings, conference calls, data entry and analysis, written communications, and public relations (figure 1).

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<sup>1</sup> [http://www.aaep.org/images/files/FAQforEquineHerpesvirus\(final\)051911.pdf](http://www.aaep.org/images/files/FAQforEquineHerpesvirus(final)051911.pdf) Accessed February 2, 2012.

<sup>2</sup> <http://www.aphis.usda.gov/nahms> Accessed January 20, 2012.

<sup>3</sup> Arizona, California, Colorado, Idaho, Illinois, Iowa, Minnesota, Missouri, Montana, Nebraska, Nevada, New Mexico, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming.

<sup>4</sup> Horses that attended the Ogden, UT, NCHA event from April 29 to May 8, 2011.

<sup>5</sup> Arizona, California, Colorado, Idaho, Missouri, Nevada, New Mexico, Oklahoma, Oregon, Texas, Utah, and Washington, and Wyoming.

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<sup>6</sup> For the purposes of this analysis, States are classified as having a case if they reported at least 1 confirmed primary or secondary case (horses that subsequently came into direct contact with horses that attended the Ogden, Utah event) of EHV-1 or EHM. For States with confirmed cases, the total number of cases includes reported suspect cases. States are classified as not having a case if they had no confirmed cases, although they may have reported suspect cases.

<sup>7</sup> Two SAHO offices reported that their employees worked overtime hours. The total overtime worked was 68 hours dedicated to various activities, and none of these hours were paid overtime hours. One VS Area Office reported their employees worked 1.5 hours of paid overtime.

**Table 1. Total reported labor hours (regular and overtime<sup>1</sup>) allocated by VS Area offices (n=5), by activity**

<b>Activity</b>	<b>Total Hours</b>
Animal-health official meetings/ conference calls/data entry and analysis	48
Written communication/public relations <sup>2</sup>	23
On-site equine facility visits	0
Public meetings and presentations <sup>3</sup>	38
<b>Total labor hours reported</b>	<b>109</b>

<sup>1</sup>One VS Area Office reported that their employees worked 1.5 hours of paid overtime. Not all employees are required to submit timesheets, so it is likely that a SAHO office reported more than 40 regular hours per week for employees but did not report hours past 40 as overtime.

<sup>2</sup>Preparing situation reports, updating Web sites, preparing and issuing news releases. Some survey respondents reported labor hours utilized on outbreak-related phone calls.

<sup>3</sup>Some survey respondents reported labor hours utilized on outbreak-related phone calls and one-on-one discussions with the public.

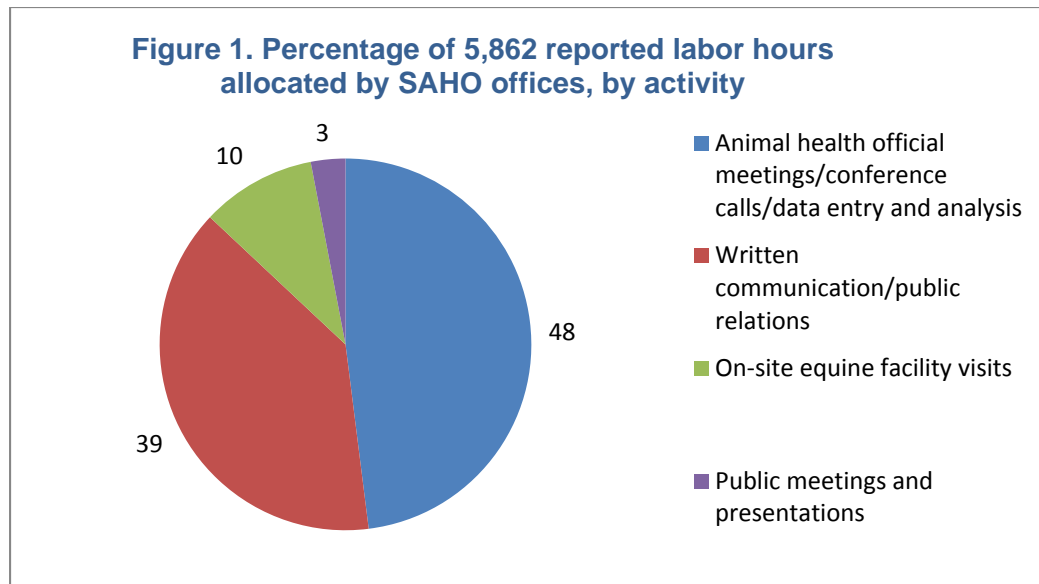
**Table 2. Total reported labor hours (regular and overtime<sup>1</sup>) allocated by SAHO offices (n=14), by activity**

<b>Activity</b>	<b>Total Hours</b>	<b>Range</b>	<b>Average</b>
Animal-health official meetings/ conference calls/data entry and analysis	2,838	15 - 937	203
Written communication/public relations <sup>2</sup>	2,270	2 - 405	162
On-site equine facility visits	559	0 - 330	40
Public meetings and presentations <sup>3</sup>	196	0 - 71	14
<b>Total labor hours reported, range, and average</b>	<b>5,862</b>	<b>17 - 734</b>	<b>419</b>

<sup>1</sup>Two SAHO offices reported that their employees worked overtime. The total overtime worked was 68 hours dedicated to various activities, and none of these were paid overtime hours. Not all employees are required to submit timesheets, so it is likely that a SAHO office reported more than 40 regular hours per week for employees but did not report hours past 40 as overtime.

<sup>2</sup>Preparing situation reports, updating Web sites, preparing and issuing news releases. Some survey respondents reported labor hours utilized on outbreak-related phone calls.

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For the seven States with cases, the time allocated by SAHO offices ranged from 1 to 16 hours per exposed horse,<sup>8</sup> with an average of 7 hours per exposed horse (table 3). In one of these States, the SAHO office allocated considerably more labor hours per exposed horse compared with SAHO offices in the other six States, resulting in a wide range of labor hours allocated and a higher average due to this outlier. To more accurately estimate average labor hours allocated per exposed horse, the weighted average was calculated using the proportion of exposed horses in a State to the total number of exposed horses in the outbreak as the weight. The seven States with cases allocated a weighted average of 3 hours per exposed horse (table 3). SAHO offices allocated the same amount of hours per exposed horse, based on the weighted average estimate, whether or not their State had cases.

VS Area and SAHO offices reported allocating hours to eight personnel types (tables 4 and 5). Veterinarians and epidemiologists accounted for the majority (74 percent) of the total number of labor hours allocated to the outbreak response (figure 2).

Response activities<sup>9</sup> for the EHV-1 outbreak spanned an average of 41 days for all participating VS Area Offices and an average of 64 days for all participating SAHO offices.

<sup>8</sup> Primary and secondary exposed horses.

<sup>9</sup> Examples include, animal-health official meetings/conference calls/data entry and analysis, written communication/public relations, on-site equine facility visits, public meetings and presentations.

The percentage of annual labor hours dedicated to the outbreak may be helpful to plan responses to future outbreaks. For example, a SAHO office with four full-time employees would have 7,520<sup>10</sup> labor hours available over the course of a year. SAHO offices with a case allocated an average of 996<sup>11</sup> hours to the outbreak, which equates to 13.1 percent of the estimated annual labor hours available.

For SAHO offices with a case, response activities related to the outbreak spanned an average of 54 days. A SAHO office with four full-time employees would have 1,236 labor hours available to respond to the outbreak during those 54 days.<sup>12</sup> SAHO offices with cases allocated an average of 996 hours to the outbreak, which equates to 80.0 percent of the hours available during the 54 days.

SAHO offices in States without a case allocated an average of 439.3 hours to the outbreak, which equates to 5.8 percent of the estimated annual labor hours available.

<sup>10</sup> Assumptions: 52 weeks - 2 weeks (10 working days) for holidays - 2 weeks for vacation - 1 week for sick leave = 47 weeks. 47 weeks x 40 hours per week = 1,880 hours. 1,880 hours x 4 full-time employees = 7,520 hours.

<sup>11</sup> Weighted average was calculated using the proportion of hours a State allocated as the weight.

<sup>12</sup> Assumptions: 54 days / 7 days per week = 7.7 weeks. 7.7 weeks x 40 hours per week = 309 hours x 4 full time employees = 1,236 hours. All regular hours, no overtime, no holidays, no leave.

**Table 3. Range, average, and weighted average reported hours allocated by SAHO offices in States with and without cases, per exposed horse**

SAHO offices . . .		Labor Hours		
		Range	Average	Weighted Average
With case	per exposed horse	1–16	7	3
Without case	per exposed horse	2–49	13	3

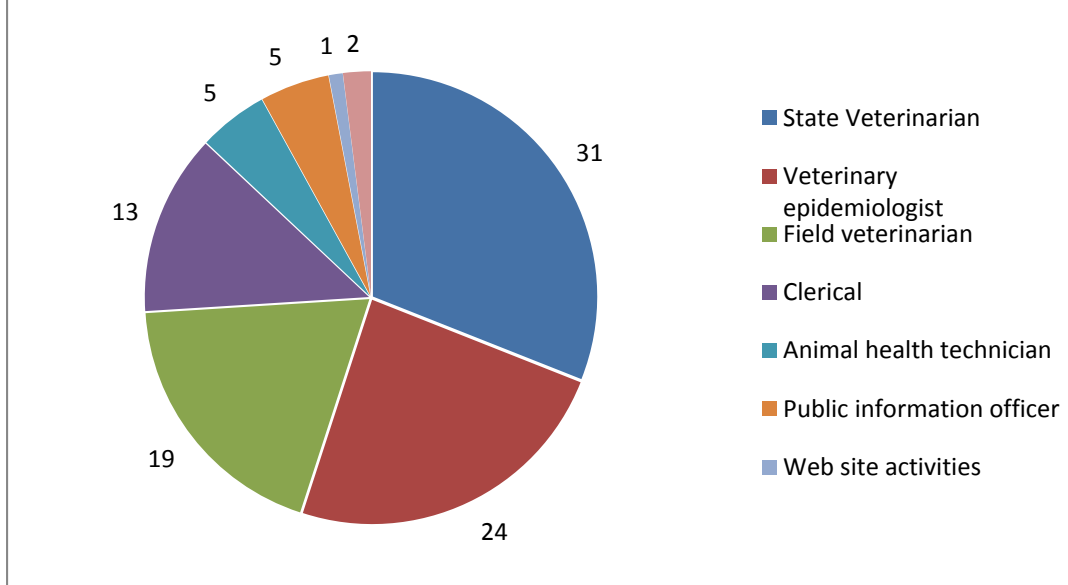
**Table 4. Total reported labor hours allocated by VS Area offices (n=5), by personnel type**

Personnel type	Total Hours
AVIC/State Veterinarian	12
Veterinary epidemiologist	47
Field veterinarian	33
Clerical	1
Animal-health technician	14
Public Information Officer	NA
Web site activities	NA
Other	2
Total labor hours reported	109

**Table 5. Total reported labor hours allocated by SAHO offices (n=14), by personnel type**

Personnel type	Total Hours	Range	Average
AVIC/State Veterinarian	1,829	2 – 620	131
Veterinary epidemiologist	1,395	0 – 360	100
Field veterinarian	1,111	0 – 420	79
Clerical	741	0 – 200	53
Animal-health technician	306	0 – 80	22
Public Information Officer	293	0 – 94	21
Web site activities	87	0 – 60	6
Other	101	0 – 45	7
Total labor hours reported, range, and average	5,862	18 – 1,622	419

**Figure 2. Percentage of 5,862 reported labor hours allocated by SAHO offices, by personnel type**



For SAHO offices in States without cases, response activities related to the outbreak spanned an average of 70 days. States without cases evaluated or tested suspect cases, followed-up on exposed horses, and communicated with constituents. A SAHO office with four full-time employees would have 1,600 labor hours<sup>13</sup> available to respond to the outbreak during those 70 days. SAHO offices without cases allocated an average of 439 labor hours responding to the outbreak, which equates to 27.4 percent of the hours available during the 70 days.

In addition to labor allocations, SAHO offices spent money on travel and other activities. SAHO offices spent \$5,707.84 for travel expenses related to outbreak response, with the average travel cost for SAHO offices being \$1,074.32.<sup>14</sup> The reported amount of money spent on travel does not include money saved or lost due to cancelled trips planned prior to the outbreak. No VS Area Office reported travel costs.

For the seven States with cases, the travel dollars allocated by SAHO offices ranged from

\$0 to \$27.27 per exposed horse, with an average of \$5.75 per exposed horse (table 6). In one of these States, the SAHO office spent considerably more on travel per exposed horse compared with SAHO offices in the other six States, resulting in a wide range of dollars spent per exposed horse and a higher average due to this outlier. To estimate a more accurate average amount spent on travel per exposed horse, a weighted average was calculated using the proportion of exposed horses in a State as the weight. SAHO offices in the seven States with cases spent a weighted average of \$2.32 per exposed horse on travel. There are several likely reasons that the average amount spent on travel per exposed horse is low. For example, some States may have had several exposed horses on just a few premises; traceouts could have been done through the responsible party via phone; or premises with exposed horses could have been located near the SAHO office.

In States without a case, SAHO offices allocated more travel dollars per exposed horse than SAHO offices in States with cases, based on the weighted average estimate (table 6). This finding was driven primarily by the size of the State and the number of exposed horses in the State. Geographically larger States tended to have more exposed horses and larger travel expenses related to investigating premises with exposed horses.

<sup>13</sup> Assumptions: 70 days / 7 days per week = 10 hours. 10 hours x 40 hours per week = 400 hours. 400 hours x 4 full-time employees = 1,600 hours. All regular hours, no overtime, no holidays, no leave.

<sup>14</sup> Weighted average was calculated using the proportion of dollars a State spent on travel as the weight.

**Table 6. Range, average, and weighted average reported travel dollars allocated by SAHO offices in States with and without cases, per exposed horse**

SAHO offices . . .		Dollars		
		Range	Average	Weighted average
With case	per exposed horse	0–27.27	5.75	2.32
Without case	per exposed horse	0–31.43	9.58	5.72

The survey included questions about how much VS Area and SAHO offices spent on testing, treatment, euthanasia, disposal, indemnity, hold order/quarantine, biosecurity, and cleaning and disinfection. While there were very few responses to these questions, some interesting and useful information was available. In three States, SAHO offices paid for the testing of 176 horses at an average cost of \$59.99 per horse. This price is comparable to the amount horse owners pay a laboratory for EHV testing. The decision to pay for testing was made by each State’s responding animal health official office.

The costs associated with hold orders/quarantines included quarantine signage, paperwork, and processing paperwork. VS Area Offices did not pay for any testing or hold orders/quarantines. Eight SAHO offices paid for 55 hold orders/quarantines at an average cost of \$3.45 per premises.

### Limitations

Limitations to this analysis include the fact that only States with primary exposed horses were asked to participate, and only 51.4 percent of VS Area and SAHO offices queried completed the survey. It is possible that VS Area and SAHO offices did not complete the survey because they did not allocate resources for responding to the EHV-1 outbreak. In addition, other States without exposed horses likely allocated time responding to questions via phone and email, updating Web site information, and participating in meetings/conference calls related to the outbreak. Furthermore, extrapolation of these data for nonrespondents using the information collected from VS Area and SAHO offices that completed the survey is not possible because of the variation in the number of cases, premises, and exposed horses among States. Only resources allocated by VS Area and SAHO offices were reported; the

resources allocated by VS national staff, VS Western Region staff, and the staff at the Centers for Epidemiology and Animal Health are not included in this estimate of resource allocation in response to the outbreak. The survey is limited to the field resources allocated to respond to the disease outbreak.

It is clear that many offices shifted resources to respond to this disease outbreak; as a result, regular daily activities were delayed or never completed. The resource estimates in this analysis are conservative and do not include the opportunity cost associated with those postponed or foregone activities. Animal health official offices are aware of the tradeoffs incurred when shifting resources to respond to disease outbreaks. If necessary, they request additional short-term assistance to complete activities or reprioritize their activities.

### Conclusions

This analysis estimates the total reported resource allocations and costs associated with VS Area and SAHO offices responding to the 2011 EHV-1 disease outbreak in the United States. The goal of this analysis is to provide information that will help SAHO offices plan for future outbreaks or emergencies. Although the disease outbreak studied here may not resemble all diseases affecting equids, it provides an estimate of the resources allocated to field-based response to a specific outbreak. This information can help estimate the resources needed for similar disease outbreaks.